

POTTER

AT-1082 AUTOMATIC THREADING TAPE TRANSPORT



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FEATURES

- Fully automatic tape threading—stops on Load Point
- Single Capstan tape drive
- Any bi-directional tape speed up to 150 ips (3,8 m/s)
- Retractable read/write head
- IBM 7- and 9-channel (IBM 360) compatible
- Speed tolerance $\pm 2\%$
- Information density to 800 bpi (NRZI) 1600 bpi (PE)
- Long term data reliability—only surface in contact with oxide is read/write head. Head retracts during rewind.
- Hard Coat head assembly virtually eliminates head wear
- No mechanical adjustments
- Photoelectric tape position sensors
- All solid-state servo controls
- Long life — minimum servicing
- U.L. approval will be made available

GENERAL DESCRIPTION

The Potter AT-1082 is the industry's lowest cost, high performance self threading tape transport. This transport records and reproduces industry compatible data in seven and nine channel formats at any bit density up to 800 bpi NRZI and 1600 bpi Phase Encoded. The AT-1082 is capable of bi-directional tape speeds of up to 150 ips (3,8 m/s). It is totally compatible with IBM 729, 2401 and 2420 Tape Transports at all recording densities.

Designed for use with the highest performance computer systems, the AT-1082 features operator convenience, high transfer rate and high-speed rewind. The simplicity of design provides an outstanding long-term data and machine reliability while eliminating mechanical adjustments and reducing maintenance to a minimum.



TAPE LOADING AND THREADING

Tape loading of this Potter unit is one of the fastest and easiest in the industry. During the Loading Operation, the operator simply mounts the tape cartridge or tape reel on the supply reel QUICK-LOCK™ hub assembly and depresses the LOAD pushbutton. When the cartridge is used it is automatically opened under machine control. Through the use of gentle air pressure and vacuum, the tape is automatically threaded onto the take-up reel. At the same time, the vertically sliding power window closes. When sufficient tape is wound on the take-up reel, tape is pulled into the vacuum tanks, the head is positioned and the tape is advanced to the LOAD POINT. The transport is then switched from LOCAL to REMOTE.

In the event the transport fails to load during cartridge operation, the tape retracts on the supply reel and a fully automatic LOAD re-try is then implemented. If the second try is unsuccessful, the tape retracts, the Load Check Indicator lights and the unit comes to a halt. When no cartridge is in use, the transport stops if the tape fails to thread on the first try.

TAPE PATH

In normal forward/reverse operation, the oxide surface of the tape touches no surface except the read/write head. The Mylar™ backing of the tape is gently guided to eliminate wear particles and to increase tape line and data reliability. During rewind, the read/write head is retracted and the tape is kept in the vacuum columns to maintain proper tension.

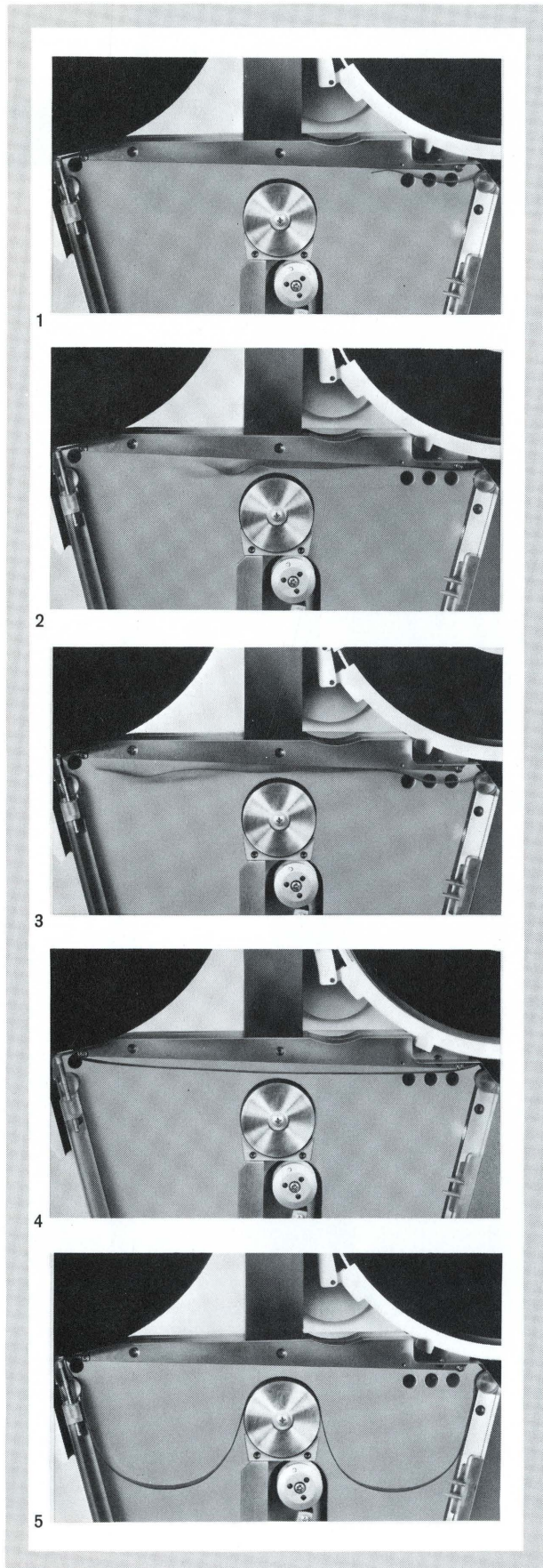


Figure 2. Automatic Tape Threading Sequence Shown in Operation

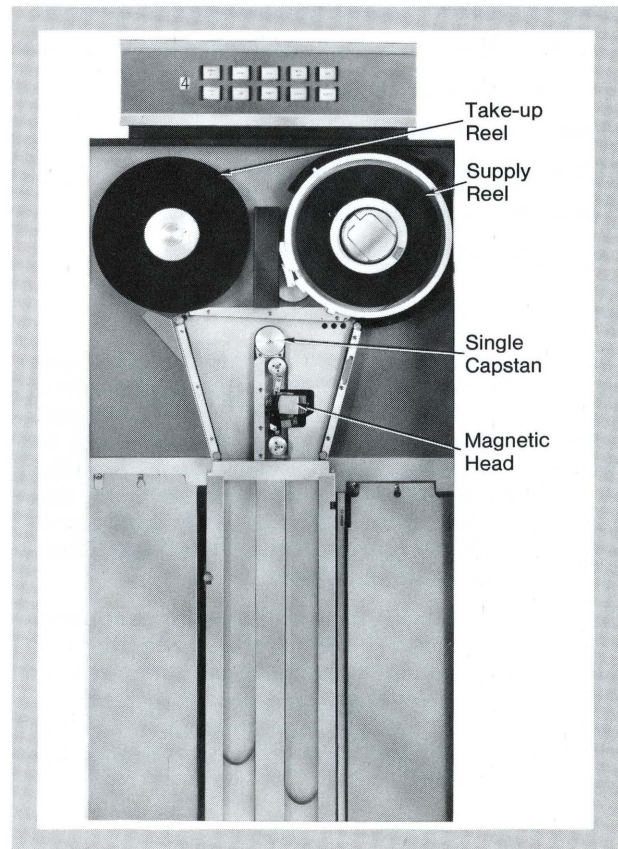
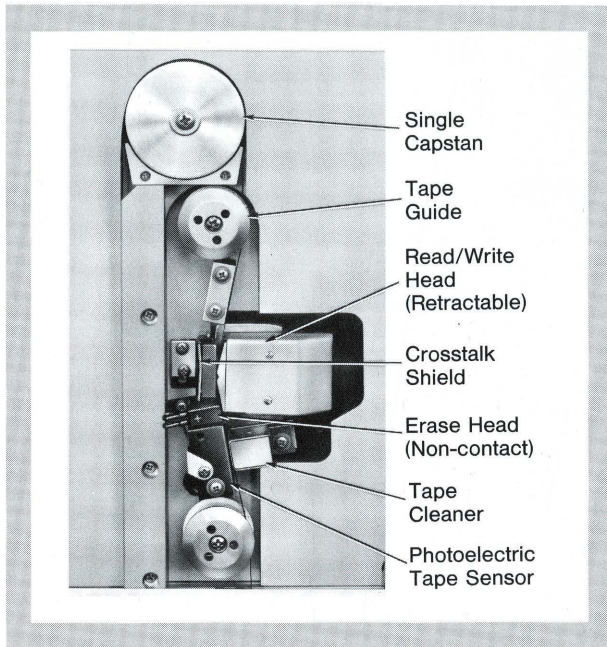


Figure 3. New Single-Capstan Tape Drive System and Direct Tape Path is Ultimate in Design Simplicity

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 ™Mylar is a trademark of E. I. du Pont de Nemours Company, Inc.



The capstan is directly driven from a high-performance dc motor. Any sequence of commands; FWD/REV, FWD/STOP or REV/STOP may be given with no intermediate delays up to a maximum of 200 commands/second. No longer are "stop-delays" or "FWD/REV delays" required. Maximum command rate may be sustained up to 5 minutes at 150 ips (3,8 m/s).

REEL SERVOS

The tape position in the vacuum columns is controlled by two "closed-loop" servo systems, one column for the left reel and one column for the right reel. Position is detected by photoelectric cells in the tank which drive the servo amplifier to control the servo motor to pay out tape into, or take up tape from the vacuum column as required to follow capstan movement. The servo motor utilizes a dynamic braking system which eliminates mechanical brakes and adjustments. The new system is "fail safe" even if AC power is interrupted during high-speed rewind, providing maximum tape protection.

An operator control panel provides for local operation and indication. Indicators and switches as shown in Figure 5 show the status of the system under local or remote conditions.

TAPE GUIDANCE

The precision edge guidance system on the AT-1082 was designed to meet precisely the industry standards. This insures complete tape interchangeability with the most widely used tape systems, both NRZI and PE. See the "Specifications" section for complete details.

LOW INERTIA CAPSTAN DRIVE

A low inertia drive provides rapid linear acceleration and deceleration while maintaining control of the tape on the capstan at all times.

The tape is driven as shown in Figure 4 by passing the tape 180° around a metal capstan coated with a resilient material. Sufficient force is applied to the Mylar side of the tape by the vacuum capstan to preclude slippage of the tape with respect to the capstan.

DRIVE ELECTRONICS

Drive electronics are all solid-state or integrated circuitry. All circuits are mounted on removable printed circuit modules. Test points are provided where required for routine maintenance or service checks. The drive electronics include all modular power supplies required for transport operation.

RELIABILITY AND MAINTENANCE

Reliability of operation is a prime requisite of computer peripheral equipment. The AT-1082 has been planned with this consideration receiving major attention. The mechanical design incorporates a minimum of moving parts. All electronic components are derated to conservative levels. Only a minimum number of electrical and mechanical adjustments are necessary in the operation of the AT-1082 Transport.

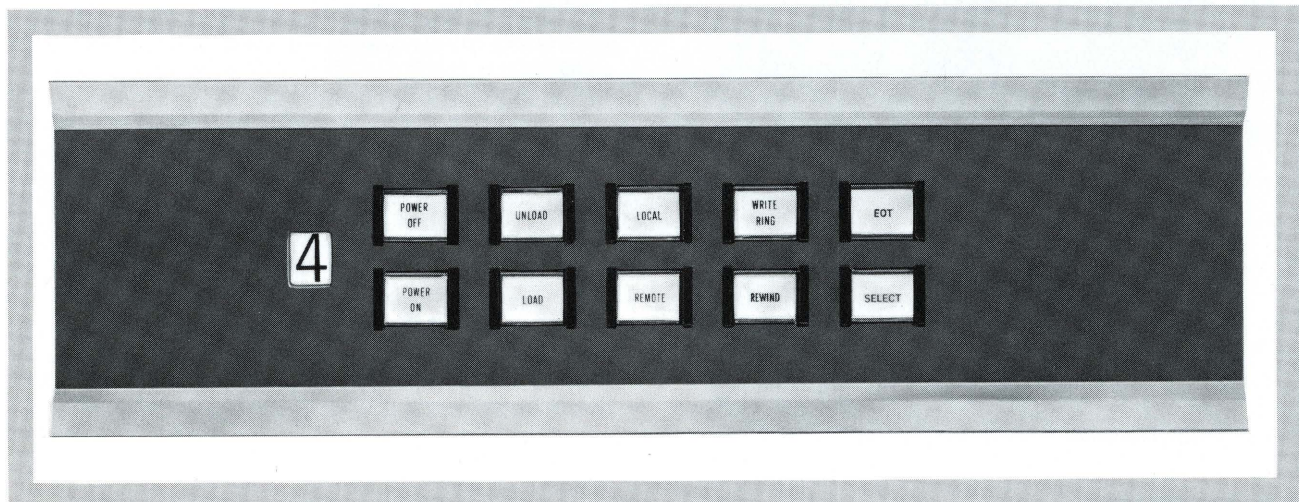
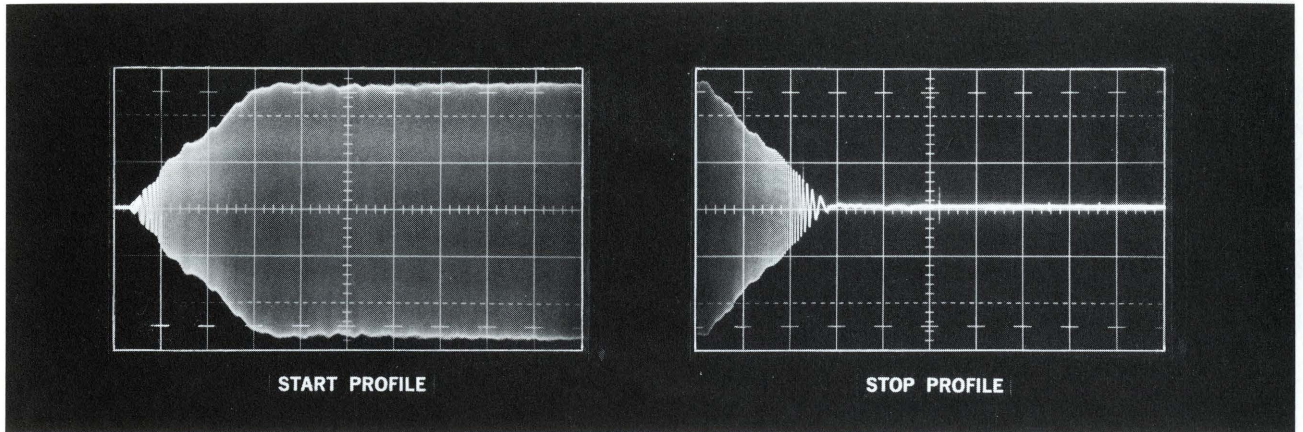


Figure 5. Operator Control Panel



EQUIPMENT

The basic Potter AT-1082 Transport consists of the following subassemblies:

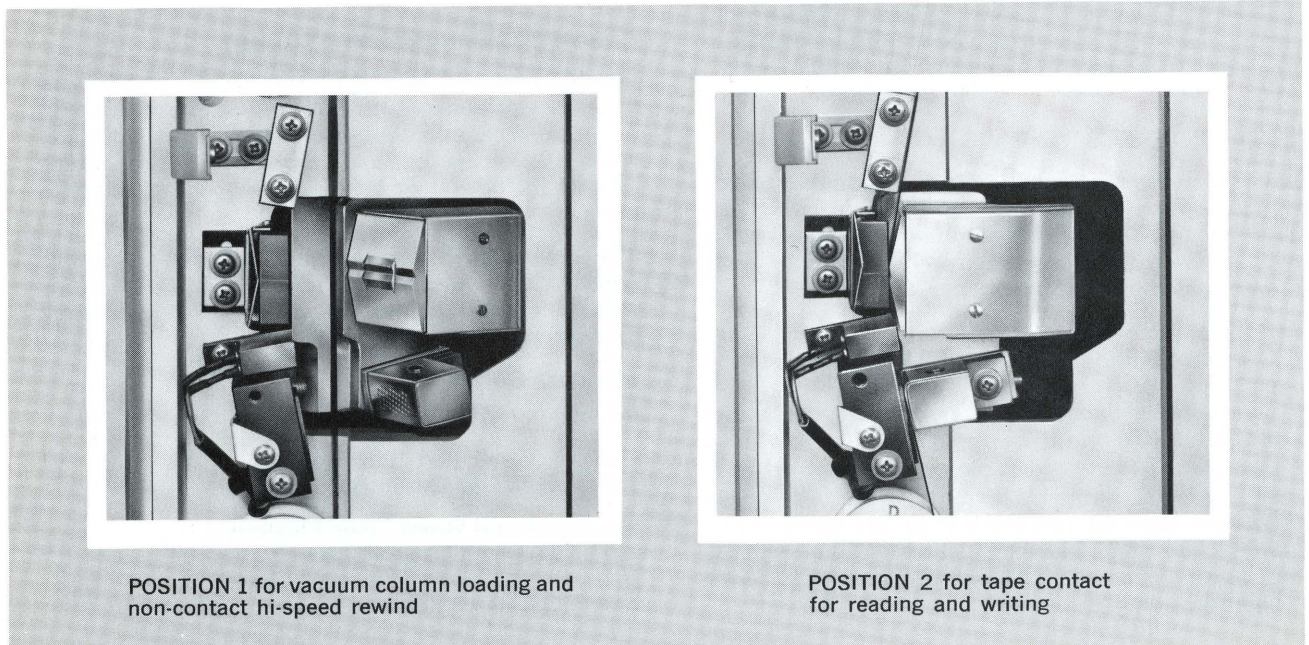
- The tape transport assembly including all tape drive components
- Transport Drive Electronics
- Retractable Head Mount
- Safety Glass Dust Cover
- Tape Cleaner
- Operator Control Panel
- Master Reel Write Lockout, (File Protect), IBM-type switch
- Single or Dual Gap Read/Write Head Assembly
- Erase Head

- 60 Hz, 208/230 VAC Input Power
- Cabinet with filtered air blower

All Potter equipment is supplied with mating connectors.

NEW RETRACTABLE HEAD PROVIDES FOR LONGER LIFE

The read/write head assembly is mounted on a 2-position hinged plate: retracted to permit vacuum column loading and for rewind (position 1), and in contact with tape for reading and writing (position 2). This action is controlled by a cam controlled positioning motor. Special construction methods have been employed to insure repeated positioning accuracy.



POSITION 1 for vacuum column loading and non-contact hi-speed rewind

POSITION 2 for tape contact for reading and writing

Figure 7. Retractable Read/Write Head Assembly

ACCESSORIES

Dual-Gap Read/Write Head

The dual gap read/write head assembly is supplied with Potter's exclusive Hard Coat surface treatment which virtually eliminates head wear, and dramatically reduces the continual need for amplifier adjustments due to head wear. The head assembly, designed for operation at transfer rates to 240 KHz (150 ips and 1600 bpi), is non-adjustable and can be replaced by normally skilled maintenance personnel.

A complete selection of Hard Coat Magnetic Heads is available, including heads for IBM 7- or 9-channel format. Dual gap read/write head assembly for 7-channel (IBM 729) operation: 0.048 inch write and 0.030 inch read tracks on 0.070 inch centers. Gap spacing 0.300 inch. Dual gap read/write head assembly for 9-channel (IBM 2401) operation: 0.044 inch write and 0.040 inch read tracks on 0.055 inch centers. Gap spacing 0.150 inch.

Reel and Hub Assemblies

Potter's compatible QUICK-LOCK® hub assembly, a standard feature on the AT-1082, provides simple loading and enhances operator convenience.

EOT/BOT Sensing

A dual channel photoelectric sensor is provided immediately adjacent to the read/write head assembly to detect the presence of standard photoreflective strips attached to the Mylar side of the tape for indicating the Load Point and End-of-Tape positions. A two-channel amplifier with logic level outputs is provided.

Write Lockout (File Protect)

A non-contact write lockout, or file protect, switch is mounted at the supply reel hub. A single form "C" contact is brought to the transport interface connector. This switch is connected to Potter MA series amplifiers to provide automatic write inhibit.

READ-WRITE ELECTRONICS

Standard read/write amplifiers are available to accommodate packing densities up to 800 bpi (NRZI) and 1600 bpi (PE). The amplifiers, designed on a modular basis, can be customized to comply with unique customer requirements.

Variations include:

- Complete NRZI and PE amplifiers for single transport application in parallel operation.
- Daisy-chained amplifiers with common electronics for both NRZI and PE.
- Complete PE system typically includes up to a one-by-eight channel transport system. The phase encoded channel includes coding/decoding, envelope check, preamble and postamble validity check, error correction, file recognition, and miscellaneous "housekeeping" functions.



CABINET (Standard with AT-1082)

The newly styled modular cabinet with tubular steel frame is equipped with front and rear service access doors. A power operated, sliding glass cover door provides ease of loading and removal of file reels. The cabinet includes door interlock and cabinet fan with filter.

The cabinet will accommodate all transport components, drive electronics, power supply and read/write electronics as well as accessories that comprise the system.

Standard Colors

Cabinet — ARMORHIDE™ Light Gray #U621

Control Panel and Trim —
ARMORHIDE Ocean Blue #U1169

Transport and Front Door Panels —
ARMORHIDE Light Gray #U242

Special paint available.

SPECIFICATIONS

TAPE DRIVE	Single Capstan
TAPE LOADING	Fully automatic tape threading and loading in less than 8 seconds Automatic BOT searching
TAPE SPEED 1/2 INCH	Standard speeds 75, 100, 112.5, 120, 150 ips (1.9; 2.5; 2.8; 3.0; 3.8 m/s) Any other speed between 75 (1.9 m/s) and 150 ips (3.8 m/s) optional
TAPE SPEED VARIATION (steady state)	±2%
REWIND SPEED AND TIME (2400 ft. reel)	100 sec max.
PACKING DENSITY	200, 556, 800 cpi NRZI 1600 bpi PE

TYPICAL PERFORMANCE

(1/2 inch 1.5 mil Mylar)	75 ips (1.9 m/s)	112.5 ips (2.9 m/s)	150 ips (3.8 m/s)
Start time (to within 10% of speed)	5 ms	4 ms	3.25 ms
Start distance — inches/cm185±.020 (.467±.051)	.225±.025 (.572±.064)	.225±.025 (.572±.064)
Stop time (max)	5 ms	4 ms	3.25 ms
Stop distance — inches/cm160±.020 (.406±.051)	.200±.020 (.508±.051)	.210±.020 (.533±.051)
Command Repetition rate (max)	200 command/sec		
SPEED STABILITY (long term 1 sec)	±2%		
(short term 15 ms)	±2%		

SKEW

	75 ips (1.9 m/s)	112.5 ips (2.9 m/s)	150 ips (3.8 m/s)
(a) Static usec	3 usec	2 usec	1.5 usec
(b) Dynamic* usec peak			
guidance + reading all 1's tape	2.5 usec	1.5 usec	1.2 usec
guidance + head + reading random tape	4.0 usec	2.5 usec	2.0 usec

*The dynamic skew figure is specified when reading a tape on the AT-1082 which has been generated on an IBM 2400 Series or for reading tapes on the IBM 2400 Series generated on the AT-1082.

TAPE WIDTH	1/2"
TAPE TYPE	3M777 or equal; 1.5 mil Mylar
TAPE REELS	Standard 10 1/2"
REEL HUBS	Potter QUICK-LOCK IBM-compatible 1/2"

REMOTE CONTROL INPUTS

- a. Logic Levels: Logic "0" = +5 Volts
 Logic "1" = 0 Volts
- b. Input Commands
 Unit Select, Direction, Run, Rewind, Rewind and Unload

STATUS REPLIES

- EOT/BOT, Ready, Unit Selected and Ready, Rewinding, Write Lockout (Form C contact)

ELECTRONICS

All control circuits fully transistorized or integrated, modular plug-in construction throughout

SERVO CONTROL

All solid state with dynamic braking eliminating mechanical brakes

ENVIRONMENTAL CONDITIONS

- Ambient Temperature-Operating (within tape characteristics)
- Non-Operating
- Humidity

POWER

208/230V AC, 50/60 Hz single-phase or 120V AC optional
6 amperes — Standby
7 amperes — Running
10 amperes — Peak (less than 100 ms)

DIMENSIONS

68"H (1.7 m) x 29"W (0.7 m) x 29"D (0.7 m)

WEIGHT

700 lbs. approx. (318 Kg)



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